

Industrial Systems Simulation

ESI 4523 Section 2615

Class Periods: T2 (8:30 -9:20 am) R2-3 (8:30 -10:25 am)

Location: FLG 0230

Academic Term: Spring 2018

Instructor:

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Office Hours: Tuesday 10 am to 12 pm, Weil 482

Teaching Assistant:

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Course Description

Credits: 3; Computer programming aspects of digital simulation. Simulation methodology and languages. Design and analysis of simulation experiments as well as applications to solutions of industrial and service system problems.

Course Pre-Requisites

COP 2271 Computer Programming For Engineers, STA 4322 Introduction to Statistics Theory, and ESI 4313 Operations Research 2 with minimum grades of C.

Course Objectives

This 3-credit course intends to introduce you some basic techniques for modeling and simulating industrial systems in the presence of uncertainty. You will gain experience in

- Understand the major capabilities and limitations of simulation
- Formulating an appropriate simulation model for a system
- Implementing the model as a computer program
- Evaluating the output of the model

Materials and Supply Fees

None

Required Software

- You must have a laptop to sign up for this course. The laptop is necessary for the in-class exercises, homework assignments, and term project.
- For the class you will require access to the ARENA Software, and the student version is freely available through the following link: <https://www.arenasimulation.com/academic/students>
- Academic version Arena is available at UFApps and UF CIRCA Labs

Required Materials

- Kelton, Sadowski, and Sturrock, "Simulation Using ARENA", 5th Edition, McGraw-Hill, ISBN 10: 0073376280 ISBN 13: 9780073376288

Recommended Reading

- Law, "Simulation Modeling and Analysis", 4th Edition, McGraw-Hill, ISBN-10: 0073294411 ISBN-13: 978-0073294414

Professional Component (ABET):

This is a course with significant design content. Throughout the semester, students will complete a team project expected to meet specific design criteria.

Relation to Program Outcomes (ABET):

Outcome	Coverage*
a. Apply knowledge	Medium
b1. Conduct experiments	High
b2. Statistical design of experiments	
c. Design	Medium
d. Function on teams	High
e. Solve problems	Low
f. Professional and ethical responsibility	
g. Communicate	Medium
h1. Economic impact	Low
h2. Global, societal, and environmental impact	
i. Lifelong learning	
j. Contemporary issues	
k. Techniques, skills, and tools for degree program	High

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not part of the course.

Tentative Schedule

Week	Tue	Class Subject	Chapter	Thu	Class Subject	Chapter	Remark
1	1/9	Introduction	1	1/11	Introduction	1/Handout	
2	1/16	Simulation Concepts	2	1/18	Simulation by Hand	2	
3	1/23	Basic Probability and Statistics	App B	1/25	Basic Probability and Statistics	App B	
4	1/30	Lab 1	Handout	2/1	Generating Random Number	12/Handout	
5	2/6	Tour of Arena	3	2/8	Tour of Arena	3 and 4	HW1 Due
6	2/13	Lab 2	Handout	2/15	Basic Modeling Using Arena	4	
7	2/20	Basic Modeling Using Arena	4	2/22	Input Analysis		HW2 Due
8	2/27	Lab 3	Handout	3/1	Exam 1	4	Project Details Announced
9	3/6	<i>*Spring Break- No Class*</i>		3/8	<i>*Spring Break- No Class*</i>		HW3 Due
10	3/13	Modeling Detailed Operations	5	3/15	Modeling Detailed Operations	5	
11	3/20	Lab 4	Handout	3/22	Output Analysis	6	
12	3/27	Intermediate Modeling	7	3/29	Steady-State Analysis	7	HW4 Due
13	4/3	Lab 5	Handout	4/5	Entity Transfer	8	Project Progress Report Due
14	4/10	<i>*Project - No Class*</i>	12/Handout	4/12	Exam 2		HW5 Due
15	4/17	<i>*Project - No Class*</i>		4/19	Project Presentations		
16	4/24	<i>*Project - No Class*</i>		4/26	<i>*Reading Days - No Class*</i>		Report Due; Peer Reviews Due

Exams

Exams will be given at 8:30 am on scheduled days. There will be no class during the scheduled class time that day.

Lab Classes

Every other Tuesday will be an in-class lab. Homework assignments will be part two of the ones done in class. The TA will walk you through the lab materials and you will be able to ask questions and work together to solve the problems. It would be a good idea to attend the lab so that you will feel comfortable with homework questions.

Homework Assignments

As stated above, homework assignments will be given following each lab. **They will be due the following week's Wednesday by 11:59 pm.** This is individual work.

Attendance

Attendance is required. For excused absences, students are expected to be aware of all announcements made in class and know all previously covered material when attending the following class.

Late Assignments and Exam Make-Up Policy

Late homework assignments will be accepted for 24 hours after the due date with a 25% deduction.

In general, there will be no makeup exams given. However, a student is permitted to make up a missed exam without penalty if he/she has a conflict between an exam/quiz and a scheduled University-approved activity (please do not ask for a make-up exam to attend a job interview). A student needing a make-up exam due to schedule conflicts must notify the instructor at least one week before the day the exam is scheduled for. Excused absences are consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

You are expected to be present without exception and to plan any travel around these dates accordingly. Medical emergencies are of course excluded if accompanied by a doctor's note. A note indicating that you were seen at the health center the day of the exam is not sufficient documentation of a medically excused absence from an exam. The note must say that you were medically unable to take the exam. If you fail to take the exam on the assigned day and do not have a valid excuse, there will be no make up exam and you will be given a zero (0) on the exam. Employment interviews, employer events, weddings, vacations, etc. are not excused absences.

Honesty Policy

All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others. Any form of cheating will be penalized.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework (5)	20 each	20%
Exam 1	100	30%
Exam 2	100	30%
Group Project	100	20%
<i>Total</i>	<i>400</i>	<i>100%</i>

Grading Policy

Grade	Range	Grade Points
A	93-100	4.00
A-	90-92	3.67
B+	87-89	3.33
B	83-86	3.00
B-	80-82	2.67
C+	77-79	2.33
C	73-76	2.00
C-	70-72	1.67
D+	67-69	1.33
D	63-66	1.00
D-	60-62	0.67

*The weighted average will be rounded to the nearest integer.

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see:

<http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.